

HYALOSTELIA AUSTRALIS, THE ANCHORING SPICULES OF
AN HEXACTINELLID SPONGE FROM THE ORDOVICIAN
ROCKS OF THE MACDONNELL RANGES, CENTRAL
AUSTRALIA.

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[*Contribution from the Australian Museum.*]

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PLATE XVIII.

In 1900 a small collection of MacDonnell Ranges fossils was presented to the Australian Museum by the Department of Mines, Adelaide. Amongst these was a small piece of red fossiliferous quartzite, the weathered surface covered with minute straight, white, rod-like bodies, and the same showing in section on the fractured ends of the entire mass. This at the time was put aside for further examination, and, as so often happens in such cases, forgotten.

These white, apparently rod-like bodies I take to be the anchoring spicules of an Hexactinellid Sponge, and referable to the genus *Hyalostelia*, Zittel (= *Pyritonema*, McCoy⁽¹⁾).

The existence of these spicules had already been recognized in the rocks of the MacDonnell Ranges. At the annual meeting of the Society, on October 17, 1893, Mr. W. Howchin⁽²⁾ "exhibited a fossil sponge, *Hyalostelia*, from the Lower Silurian rocks of the MacDonnell Ranges, forwarded by Mr. Thornton, of Tempe Downs. The only other site where it is known to occur in South Australia is in the Cambrian rocks at Curramulka."

Professor R. Tate briefly referred in his account of the Horn Expedition fossils to the occurrence of sponge rootlets in quartzite at Finke Gorge. He described⁽³⁾ them as cylindrical casts, 1.5 mm. in diameter, extending through a vertical thickness of four inches. Notwithstanding these

(1) McCoy: Ann. Mag. Nat. Hist., vi. (2), 1850, p. 273.

(2) Howchin: Trans. Roy. Soc. S. Aus., xvii., pt. ii., 1893, p. 355.

(3) Tate: Report Horn Expdn. Central Austr., pt. iii., 1896, p. 113.

casts are larger than *Hyalostelia* rods proper, Tate yielded preference to a sponge view of their nature rather than regard them as Annelide burrows.

The cylindrical rods forming the specimen now before me, and which I propose to term *Hyalostelia australis*, have a variable diameter of 0·19-1·39 mm., the longest preserved piece measuring twenty millimetres. They are circular in section, and when the strong mineral alteration the rods have undergone allows the structure to be seen, it is concentric. In many an axial tube is still apparent. These spicular cables are quite free and unattached to one another, without any trace of "rope-like bundles," and although not all absolutely parallel to one another, lie more or less in one direction.

The matrix is a compact quartzite slightly iron-stained in colour, and the rods being white stand out in strong contrast.

As already stated, the spicular rods are siliceous like the matrix, but in places have undergone a secondary chalcedonic change, and when this is so all structure is obliterated, the alteration taking the form of bleb-like particles. Neither hooked-like terminations nor projecting decorative structures were observed.

The variation in the spicule diameter (0·19-1·39 mm.) is quite in keeping with that of the already-described species, *H. fasciculus*, McCoy, sp. (·15-·7 mm.). Dr. J. G. Hinde comments on this variability in the anchoring spicules of the above species,⁽⁴⁾ which is met with in limestones of Llandeilo age; these also are converted into chalcedonic silica.

The diameter of the MacDonnell Ranges anchoring spicules, therefore, very considerably exceeds that of the British form, and will afford a ready means of distinguishing the two until the body of the sponge proper in *H. australis* is discovered.

As a matter of strict priority the name *Hyalostelia*, Zittel, 1878, should give place to that of *Pyritonema*, McCoy, 1850. Dr. Hinde, however, has retained the former, but in the English edition of Zittel's "Text-book of Palaeontology," by Eastman,⁽⁵⁾ the two are separately maintained, *Pyritonema* being defined as "fascicles of long, stout spicules, supposed to be root tufts"; whilst in *Hyalostelia* the anchoring spicules are "root-tufts composed of elongated, slightly-bent fibres, sometimes terminating in four recurved rays."

Mr. Howchin was kind enough to lend me his specimen, when I found that it and the Museum example form portions

(4) Hinde: Mon. Brit. Foss. Sponges, pt. 2, 1888, p. 112.

(5) Vol. i., 1900, p. 55.

of one and the same piece of rock. When united the two pieces measure one and a quarter inches long, one and a half inches wide, and three-quarters of an inch thick, the spicular rods extending throughout.

I am indebted to Mr. Howchin for the following remarks [August 31, 1916]:—

“From the material in my hand I think there must be at least two clearly distinct species. Notwithstanding the inclusion of rods of different diameters in the same individual, there is, in all my examples, a certain preponderance of a given diameter in the rods of any one particular sponge. This also seems to be borne out by the descriptions and figures hitherto published. That is to say, in a certain number of cases the individual rods do not, throughout the entire specimen, attain a diameter of more than half that of the average size of other examples. The diameters of the respective species, as described, are as follows (Hinde’s figures being used):—

Group I. (fine hair-like rods).	{	<i>Hyalostelia parallela</i> , McCoy, 0.2 to 0.5 mm.
		<i>H. (Pygironema) fasciculus</i> , McCoy, 0.2 to 0.5 mm.
		<i>H. (Hyalonema) youngi</i> , Eth., junr.
		Described as “hair-like.”
Group II. (stout rods).	{	<i>Hyalostelia australis</i> , Eth., junr., 0.19 to 1.39 mm.
		<i>H. (Hyalonema) smithii</i> , Y. and Y., 0.3 to 1.5 mm.

“It is true that *H. australis* (rods) do ‘considerably exceed’ in size those of *Pygironema fasciculus*, but they are, if anything, a little smaller than those of *H. smithii*. The Tempe Downs example comes so near to the Carboniferous *H. smithii* that I regarded it as indistinguishable from that form, and for that reason did not define it as a new species.”

EXPLANATION OF PLATE XVIII.

HYALOSTELIA AUSTRALIS, Eth., *figs.*

- Fig. 1. Transverse section of anchoring spicules— $\times 4$ diam.
 „ 2. Longitudinal section of several spicules— $\times 7$ diam.

In both sections the dense black portions in the spicules are the silicified tissue; the white patches, on the contrary, are the blebs of chalcedonic silica. In the transverse section (fig. 1) some of the axial canals are visible (as at *a*), and again in a longitudinal section (fig. 2, *b*).